From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1
Date: 8/21/02 4:25PM
Subject: Re: Re:

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So Cement Creek loading should be the same as when there was treatment of the full AT flow - pre concent decree.

>>> "William Simon" <wsimon@frontier.net> 08/21/02 03:17PM >>>
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Are your numbers for Zn or not??? If so, 45 #/day at AT is no dribble but rather the largest loader in the basin!
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From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
To: <wsimon@frontier.net>
Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>
Sent: Wednesday, August 21, 2002 1:31 PM
Subject: Re:

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> is about to do 20 years of remediation in trade for SGC ability to get
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CC: Holm, J.David; Ross, Andrew

From: "William Simon" <wsimon@frontier.net>
To: "Sarah Johnson" <Sarah.Johnson@state.co.us>
Date: 8/21/02 6:16PM
Subject: Re: Re:

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The second plug appears to be leaking the tainted water from behind the plug! It has already gone up a factor in the last 12 or so months (since bulkhead installation). Seems like it just took a while for the outlying fractures to transport the water from behind the first bulkhead. What was the zinc load in the discharge before the second bulkhead was installed?

Another growing concern I have. If SGC is released from its discharge permits doesn't that mean the springs and seeps are no longer regulated? Well, where will the water come out after the Mogul is plugged. The Grand Mogul, the Grand Mogul open stope, the shaft into the Mogul between the Mogul and Grand Mogul, up higher at the Brennamen vein stope, springs and seeps, more out the various adits of the Gold King, or where? I hate to be the one to ask the questions but it's becoming apparent to me that the overall efforts of all stakeholder participants should be protected-whatever that might mean in the current situation. bill

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From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
To: <wsimon@frontier.net>
Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>; "J.David Holm" <jdholm@smtpgate.dphe.state.co.us>
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From: Peter Butler <pbutler@frontier.net>
To: <Sarah.Johnson@state.co.us>
Date: 8/21/02 10:11PM
Subject: New Consent Decree

Hi Sarah - I've been talking with Bill and he passed me copies of the e-mail exchanges you two have had. In looking at the Mogul data, I notice the flow from the adit has increased by about 170 gpm. 170 gpm adds up to about 900 acre-feet of water in just over 3 years. If my memory serves me correctly, Larry told me a couple of years ago that the Sunnyside mine pool holds 900 acre-feet. It may very well be that the mine pool has stabilized because of the flow out of the Mogul and Gold King (whatever that increase is)

Assuming Bill is correct and the Mogul is connected to the Grand Mogul and some open stopes, plugging the Mogul will simply raise the mine pool (it is already slightly over its design capacity) and send the water and metal load out somewhere else. We may end up with the situation that the Division feared in the initial consent decree except that instead of greater flow from seeps and springs, we'll see it from other mine workings.

If this scenario plays out, the AT treatment plant will have to continue treating the North Fork to maintain zinc concentrations downstream. Its just like Sunnyside treating the AT before the consent decree.

The bonus we get is the bulkhead in the Kohler, but the minus is there are no plans to use the treatment plant to treat the North Fork.

- Peter

CC: <Wsimon@frontier.net>, <jrowenjr1@earthlink.net>

From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1; butler, peter
Date: 8/22/02 10:03AM
Subject: Re: Re:

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CC: Holm, J.David; Ross, Andrew

From: "William Simon" <wsimon@frontier.net>
To: "Sarah Johnson" <sarah.johnson@state.co.us>, "Sarah Johnson" <sejohnso@smtpgate.dphe.state.co.us>
Date: 8/22/02 1:02PM
Subject: CD

Sarah,

As I understand it the graph you presented at the meeting with the new method of calculation for Zn at A72 included removing both the RPS 82 site from the base condition as well as removing the SGC originally preferred method of using 3 flow classes. Is this correct? If so you have not demonstrated the RPS 82 site has had any negative effect on the model. What happens if you do the same analysis with all data including RPS and without the flow classes? I just found out that the UAA does use the RPS site for the model, designated as A72. Damn! But I'm not yet convinced we want to change things unless necessary and justified. SGC may be confusing the issue. Have they met CD compliance after completion of the bulkheads and other remediation work with no treatment of CC as the CD requires?

A better evaluation of the impact of the effect of treatment and the decree terms might be done at CC48. The gauge is more accurate for one thing and less influences from groundwater and the other stream flows. And won't you look at the impact at CC48 and A72 during the period when the treatment plant was turned off. Seems to me we need to know what to expect at least.

From your previous email about Bob's analysis, "Our understanding from him was that the affects of treatment of Cement Creek was included in his model with a dummy variable and that the standards at A-72 did not assume continued treatment of Cement Creek". I think Bob demonstrated there was a reduction in Zinc at CC48 but no detectable change at A72. He played down the impact because he didn't feel the data was conclusive. Remember there was a lot of other things (disturbances) going on in the basin at this time. I'm quite sure he did not back out the treatment to calculate what we recommended the numeric standards to be. We have never been privy to SGC operation of the plant; what, when, how much, flows, etc. I still have almost no data from them. Therefore no way of knowing what the impacts of the treatment plant were or are. bill

From: "William Simon" <wsimon@frontier.net>
To: "Sarah Johnson" <Sarah.Johnson@state.co.us>
Date: 8/22/02 1:15PM
Subject: Re: Re:

Responses in Bold

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To: <pbutler@frontier.net>; <wsimon@frontier.net>
Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>; "J.David Holm" <jdholm@smtpgate.dphe.state.co.us>
Sent: Thursday, August 22, 2002 10:03 AM
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NO, IT'S ALWAYS BEEN 50%, ACTIVE TREATMENT IS 85%.
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> > To: <wsimon@frontier.net>
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From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1; butler, peter; owen, bob
Date: 8/22/02 4:24PM
Subject: Re: CD

Yes, the newly proposed method would remove the RPS-82 data from the refence data set and use a regression approach using flow and "rise" as the independent variables. We would not use the flow classes any more.

There is no good correlation between flow and zinc in the original reference data set that includes the RPS-82 data, whether or not the "rise" effect is included as a dummy variable (R-sq is about 0.42). Post CD data (all taken at A-72) shows a very strong correlation. I think the evidence is convincing that the RPS-82 data is inappropriate to use in the Reference data set.

Regarding Attainment of the CD goal: After all the remediation work (A-List projects) have been completed, but continued diversion and treatment of Cement Creek, Water Quality at A-72 is a little be better than the revised reference data set says it was in the Pre CD times.

What we are trying to do is adequately predict what WQ will be after the new portal plugs and the end of diversion of Cement Creek.

>>> "William Simon" <wsimon@frontier.net> 08/22/02 12:54PM >>>
Sarah,

As I understand it the graph you presented at the meeting with the new method of calculation for Zn at A72 included removing both the RPS 82 site from the base condition as well as removing the SGC originally preferred method of using 3 flow classes. Is this correct? If so you have not demonstrated the RPS 82 site has had any negative effect on the model. What happens if you do the same analysis with all data including RPS and without the flow classes? I just found out that the UAA does use the RPS site for the model, designated as A72. Damn! But I'm not yet convinced we want to change things unless necessary and justified. SGC may be confusing the issue. Have they met CD compliance after completion of the bulkheads and other remediation work with no treatment of CC as the CD requires?

A better evaluation of the impact of the effect of treatment and the decree terms might be done at CC48. The gauge is more accurate for one thing and less influences from groundwater and the other stream flows. And won't you look at the impact at CC48 and A72 during the period when the treatment plant was turned off. Seems to me we need to know what to expect at least.

From your previous email about Bob's analysis, "Our
understanding from him was that the affects of treatment of Cement Creek
was included in his model with a dummy variable and that the standards
at A-72 did not assume continued treatment of Cement Creek". I think Bob demonstrated there was a reduction in Zinc at CC48 but no detectable change at A72. He played down the impact because he didn't feel the data was conclusive. Remember there was a lot of other things (disturbances) going on in the basin at this time. I'm quite sure he did not back out the treatment to calculate what we recommended the numeric standards to be. We have never been privy to SGC operation of the plant; what, when, how much, flows, etc. I still have almost no data from them. Therefore no way of knowing what the impacts of the treatment plant were or are. bill

CC: Holm, J.David; Ross, Andrew

From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1; butler, peter; owen, bob
Date: 8/22/02 4:35PM
Subject: Re: Re:

1) I'll ask Larry to email the data to you
3) our mistake
4) No, there is not a "direct" connection to the Mogul. there were interior mine plugs put in. There may be fracture flow between the mines but the geohydologic modeling shows that as a tremendously tortuous route - and a very low flow rate. (not enough to explain the flows from the Mogul)

I don't think we disagree that the plugging of the Sunnyside is probably a causative factor in flows in the Mogul. That is, the loss of the flow path through the mine, means the metoric water can no longer go thru the Sunnyside and down the AT. It has to go somewhere else. However, without a direct connection and without proof that it is Sunnyside mine pool water coming out the Mogul, the Division has no cause of action against SGC. It isn't their water, or their mine. We probably would have a weaker case than Todd Hennis would to sue them. (But they are offering to plug it)

Sunnyside is not obligated under the CD to continue to treat Cement Creek after the A List projects are complete.

>>> "William Simon" <wsimon@frontier.net> 08/22/02 01:07PM >>>
Responses in Bold

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From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1; butler, peter; owen, bob
Date: 8/22/02 5:03PM
Subject: Re: Re:

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CC: Holm, J.David; Ross, Andrew

From: Sarah Johnson
To: "pbutler@frontier.net".GWIA.DPHED1; owen, bob; simon, bill
Date: 8/23/02 3:24PM
Subject: Re: New Consent Decree

Hi, glad you're on the line

The portal plugs are designed for water all the way up to Lake Emma. And there are humungous safety factors. The plugs are sound. But you are right, the mine pool went higher than they estimated it would.

Here's some approximate elevations for reference

Lake Emma	12,200
Mogul 3 level (Grand)	11,815
Mogul open stope	11,810
Mogul 2 level	11,715
Sunnyside Mine Pool	11,666
Terry T inside plug	11,555
Terry T outside plug	11,521
Mogul 1 level	11,440
Gold King	11,400
American T plug 1	10,652
American T plug 2	10,612

The connection inside, between the Mogul and the Sunnyside was at 11,900 (below the current water level). A plug was placed below that elevation in the drift that went up to the connection and one was placed above, in a raise that went down (over) from the Lake Emma level.

Nobody knows where the Mogul water will go. The open stopes (land surface) are considerably above the Mogul portal and are on the Ross Basin side of the Mountain above Cement Creek. The Grand Mogul is right next to the open stopes. The mine maps apparently aren't complete or altogether reliable about connections. SGC thinks the Mogul portal is connected to the Grand Mogul. The mine pool is not up to the Grand Mogul elevation.

I guess I don't understand the issue about the North Fork. The Gold King discharges to the North Fork, but the loading has not increased (flows have increased and concentration decreased). But that is supposed to be treated in the WWTP.

>>> Peter Butler <pbutler@frontier.net> 08/21/02 10:05PM >>>
Hi Sarah - I've been talking with Bill and he passed me copies of the e-mail exchanges you two have had. In looking at the Mogul data, I notice the flow from the adit has increased by about 170 gpm. 170 gpm adds up to about 900 acre-feet of water in just over 3 years. If my memory serves me correctly, Larry told me a couple of years ago that the Sunnyside mine pool holds 900 acre-feet. It may very well be that the mine pool has stabilized because of the flow out of the Mogul and Gold King (whatever that increase is)

Assuming Bill is correct and the Mogul is connected to the Grand Mogul and some open stopes, plugging the Mogul will simply raise the mine pool (it is already slightly over its design capacity) and send the water and metal load out somewhere else. We may end up with the situation that the

Division feared in the initial consent decree except that instead of greater flow from seeps and springs, we'll see it from other mine workings.

If this scenario plays out, the AT treatment plant will have to continue treating the North Fork to maintain zinc concentrations downstream. Its just like Sunnyside treating the AT before the consent decree.

The bonus we get is the bulkhead in the Kohler, but the minus is there are no plans to use the treatment plant to treat the North Fork.

- Peter

CC: Holm, J.David; Ross, Andrew

From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1; butler, peter; owen, bob
Date: 8/23/02 3:41PM
Subject: Re: Re:

Mogul pH has risen (generally) since the burp from 2.1 to about 3.6. The recent data on the Mogul are consistent with the past

Other loads of interest (flows & concentrations varied - these are ballpark numbers for comparison) (feel free to check my math...it is Friday)

Original American T (pre CD)	1600 gpm	22 mg/L	423 lbs/day
Original Terry T (annualized)	250	50	150
AT after Plug 1 (median)	746	23	206
AT after Plug 2 (median)	263	12.8	40

The Mogul is about 20% of the original SGC load of 573 lbs/day

>>> "William Simon" <wsimon@frontier.net> 08/23/02 11:41AM >>>
Oops, yes your correct, hardness would go up if Calcite is present. So less hardness could be due a different water source or chemical scavenging of Ca, or both. What is the pH of the Mogul discharge now? Is there more recent Mogul data that may indicate a tread? bill

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From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
To: <jrowenjr1@earthlink.net>; <pbutler@frontier.net>; <wsimon@frontier.net>
Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>; "J.David Hole" <jdholm@smtpgate.dphe.state.co.us>
Sent: Thursday, August 22, 2002 5:03 PM
Subject: Re: Re:

> about the Hardness - I disagree
> the pH would go up, but the hardness would too
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> >>> "William Simon" <wsimon@frontier.net> 08/22/02 01:07PM >>>
> Responses in Bold
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> From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
> To: <pbutler@frontier.net>; <wsimon@frontier.net>
> Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>; "J.David Holm"
> <jdholm@smtpgate.dphe.state.co.us>
> Sent: Thursday, August 22, 2002 10:03 AM
> Subject: Re: Re:
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> > 2) Yes, the increased load is Huge
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> > 5) The bulkheads are not leaking. With no place to drain to, the
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> > Grand
> > Mogul, the Grand Mogul open stope, the shaft into the Mogul between
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> > and
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> > <jdholm@smtpgate.dphe.state.co.us>
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> > > To: <wsimon@frontier.net>
> > > Cc: "Andrew Ross" <Aross@smtpgate.dphe.state.co.us>
> > > Sent: Wednesday, August 21, 2002 1:31 PM
> > > Subject: Re:
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> > > > We aren't including any estimate of reduced loading from the
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> > > > Thats what we are working on.
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> > > > (Plugging the Kohler and Mogul are HUGE bennefits)
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CC: Holm, J.David; Ross, Andrew

From: Sarah Johnson
To: cin:lperino@compuserve.com
Date: 8/23/02 3:48PM
Subject: Re: Re:

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CC: Ross, Andrew

From: "William Simon" <wsimon@frontier.net>
To: "Sarah Johnson" <Sarah.Johnson@state.co.us>
Date: 8/27/02 5:50PM
Subject: Re: Sunnyside CD

You said "The trick is predicting what the concentrations at A-72 will be when
treatment is turned off, and AT Mogul and Kohler plugged, and Steve F treats the Gold King." So I thought you would be trying to predict what will happen. Are you? Actually Steve is not committing to treating the Gold King as I understand it. Otherwise I think all the questions are out there and hopefully they will help with your decision. I don't know of anyone changing their minds since the meeting-only folks wanting to make sure you've analyzed the data and hopefully knowing what your doing. There's a lot of assumptions that one has to make-we know from the experience of developing the UAA. bill

----- Original Message -----
From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
To: <jrowenjr1@earthlink.net>; <pbutler@frontier.net>; <wsimon@frontier.net>
Sent: Monday, August 26, 2002 3:20 PM
Subject: Sunnyside CD

> I'm not sure if I got all the questions answered. Are there any that I
> missed?
>
> Let me know

From: Sarah Johnson
To: "wsimon@frontier.net".GWIA.DPHED1
Date: 8/28/02 8:25AM
Subject: Re: Sunnyside CD

Whether or not Steve F is commiting to the Gold King treatment may become a permit issue between Steve and the Division. The way I understand it, it won't be in the revised settlement agreement, but SGC will make it possible for treatment of water to continue at Gladstone, and I think - transfer the permit to Steve.

About predicting the expected water quality, that what we doing. As soon as we have a decent draft, we'll share it with you

yes, we are trying to predict what the WQ will be at A72

>>> "William Simon" <wsimon@frontier.net> 08/27/02 04:33PM >>>
You said "The trick is predicting what the concentrations at A-72 will be when
treatment is turned off, and AT Mogul and Kohler plugged, and Steve F treats the Gold King." So I thought you would be trying to predict what will happen. Are you? Actually Steve is not committing to treating the Gold King as I understand it. Otherwise I think all the questions are out there and hopefully they will help with your decision. I don't know of anyone changing their minds since the meeting-only folks wanting to make sure you've analyzed the data and hopefully knowing what your doing. There's a lot of assumptions that one has to make-we know from the experience of developing the UAA. bill

----- Original Message -----
From: "Sarah Johnson" <Sarah.Johnson@state.co.us>
To: <jrowenjr1@earthlink.net>; <pbutler@frontier.net>; <wsimon@frontier.net>
Sent: Monday, August 26, 2002 3:20 PM
Subject: Sunnyside CD

> I'm not sure if I got all the questions answered. Are there any that I
> missed?
>
> Let me know

CC: Ross, Andrew